POTABLE WATER
AND
SEWAGE DISPOSAL SURVEY

COMMUNITY OF BISCOTASING
TOWNSHIP OF MARGARET

1982

Ontario
Ministry
of the
Environment

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SUMMARY

In July 1981, a survey of the potable water supplies and the sewage disposal facilities in the Community of Biscotasing, in Margaret Township, an unorganized area of Sudbury District, was conducted by MOE staff.

From the data collected, it was determined that 54% of the residents carry their water from a neighbour's well or a community well. Seventy-nine percent (79%) of the residents of the community either did not have water, or felt that the supply on their property was not adequate. In general the water quality of the dug wells is poor with seventy-one percent (71%) of the dug wells being contaminated bacteriologically to some extent.

It appearS that drilled wells are the only good source of potable water, both in quantity and quality, for the residents of the community.

The sewage disposal systems were mainly pit privies and leaching pits (72%). These appeared to be adequate for the present water usage. If, however, a more abundant supply of water should become available, most of these systems would need to be replaced.

INTRODUCTION

On July 15 and 16, 1981 a survey was conducted by the Ministry of the Environment (MOE) in the community of Biscotasing to determine the quality and quantity of water available to the residents and the adequacy of their sewage disposal facilities.

The survey was conducted in response to a request made by the Biscotasing Citizens Committee through the Ministry of Northern Affairs.

Biscotasing is a small community, population of less than one hundred, located in the unorganized township of Margaret, in Sudbury District on the main line of the Canadian Pacific Railway. The community is about 100 years old. It has been associated since it's existance with the fur trade, lumber industry and the Canadian Pacific Railway. At present the community is a tourist transfer/service point for fishermen, hunters and canoests.

The community is isolated (see Figure #1, an excerpt of the provincial roadmap). It is approximately 275 km from Sudbury by road, with the last 75 km being a poorly maintained gravel forest access road. The Via Rail "budd car" does stop at the community, however, it operates May to September only.

The commercial establishments in the community are a general store and a number of seasonally-operated tourist camps. A few residents are employed by Inco Limited to operate and maintain their dams in the area and one person works on a temporary basis for the CPR. There are no forest workers living in the community. It was reported that a number of people are returning to the community to retire.

Electricity for the community is supplied by an on-site diesel generator and telephone service to the outside is by microwave towers.

The community is located along the shore of Lake Biscotasing. The CPR railway tracks running east to west and north cut the community into two parts. Generally, the older part of the community is located on the north side of the tracks. Figure #2 illustrates the plan of the townsite.

TOPOGRAPHY AND PHYSIOGRAPHY

The area is characterized by rolling, rocky topography. The south side of the tracks contains fewer rock outcrops and is flatter compared to the north side.

The soil makeup of the area is shallow consisting mostly of clay and sand with some loams present in the southern section. The bedrock appears to be made up largely of rock, characteristic of Pre-Cambrian Shield areas.

The vegetation of the area is typical of the Great Lakes - Saint Lawrence forest region with the dominant and codominant species being Red Pine, Jack Pine, and White and Yellow Birch.

Surface drainage, which is towards Lake Biscotasing, is disrupted by the rock outcroppings. This poor drainage pattern leads to a number of swampy areas being found in the community. Most of these areas, shown on figure #2, are found on the north side of, and adjacent to, the railway tracks.

SURVEY PROCEDURES

Prior to interviewing the tenants or home owners, each residence in the study area, was located on a map, and a reference number assigned to it (see Figure #2).

A survey form (Appendix A) was completed at each residence in the area by interviewing the tenant or owner. A diagram was produced for each lot which showed the location of the well and the sewage disposal system. At the same time, the conditions of the sewage system, well, and topography of the lot, were ascertained.

Where drinking water was available, samples were collected for bacteriological examination and chemical analysis. The samples taken for bacteriological analysis were forwarded to the Sudbury Ministry of Health Laboratory for examination. Those samples taken for chemical analysis were shipped to the MOE Laboratory in Toronto. Three of the 16 supplies were sampled for metals analysis to indicate overall well water qualities in these parameters.

SURVEY FINDINGS

The Community of Biscotasing is made up of a mix of year-round and seasonal residences. The locations of seasonal residences were noted, but full survey interviews were only given to individuals claiming year-round residency.

The community was found to have 28 year-round residences and at least 30 seasonal residences, cottages, and tourist camps. There is also a general store, a railway station, an electric diesel generator station operated by Ontario Hydro, a Bell telephone exchange building, an unmanned Ministry of Natural Resources camp and 2 church buildings. It was also noted that not all establishments are presently connected for hydro power.

i) Property Ownership

Prior discussions and the survey interviews revealed that many of the year-round residents in the community do not have full title to the property on which their houses are located (see Table A).

Eleven of the 28 residents indicated that they lease their lot from the Canadian Pacific Railway through Marathon Realty. These leases would appear to have been in existence

for at least 25 years and apparently Marathon Realty has not been receptive in the past to attempts by residents to purchase their properties.

There is also one additional property leased from a private individual.

Due to the irregularity of much of the townsite, many of the road locations are not consistent with legal plan drawings of the area. It would appear that the locations of many residences, with respect to their relative property allocations, may also be argumentative. Houses, in many cases, have been located where local rock outcrops and landforms would most easily permit, while still being within the general area of their lot designations. Due to the longstanding lease status of many of the lots, and few sales transactions, there are probably few surveyed properties in the community. Apparently, a major cost impediment that would be involved in any consideration of purchasing the Marathon leased properties would be the cost of a legal survey

ii) Sewage Disposal

Table B summarizes the types of the sewage disposal systems reported by residents.

Of the 28 residences inspected, all had some form of private sewage disposal system. Of these, 8 (29%) are septic tank and tile fields, 17 (61%) are pit privies, 3 (11%) are cesspools.

It was found that the common combination for the disposal of sewage and wash water was that of a pit privy and leaching pit.

Systems ranged in age from one month to greater than 25 years. The age of the majority of the systems could not be determined.

Of those systems for which an age could be determined, 14 (39%), were found to be less than 5 years old.

The lot inspections revealed no sewage systems with an existing or potential pollution problem. It should be noted, however, that this would be expected with the limited water available to the residents. If more water was available, many of these systems would not be adequate.

iii) Water Supplies

The summary of water supply sources is presented in Table C.

Of the 28 residences investigated, only 15 (54%) had their own private water supply systems. The remaining residences obtained domestic water from neighbours or one of the two community dug wells in the area. Of the 15 domestic water supplies, 6 were drilled wells, and 9 were dug wells.

The depths of the 9 dug wells ranged from 3 - 17 feet usually down to bedrock. The average depth was found to be about 9 feet. Few of the dug wells were equipped with electric pumps or pressure systems.

The majority (66%) of the drilled wells were over 200 feet in depth. An average depth for the drilled wells was found to be 247 feet. All drilled well installations had electrically driven pumps and pressure systems.

In Table D, the consumer complaints are presented. During interviews with the residents who had a water supply, 7 (43.8%) complained of taste problems, 7 (43.8%) of the color of the water, 4 (25%) of water quality, 2 (12%) of odour problems, 7 (43.8 %) of insufficient quantities, and 5 (31.5%) of iron. Of the 13 private supply systems, 7 (54%) of the owners felt they had quantity problems. Most of the residents had more than one complaint about the quality of their water.

The survey revealed that many of the residences (15) did not have their own water supply. The interviews with the residents indicated that attempts to establish dug well water supplies at these sites had been unsuccessful yielding too little water to justify their maintenance when a few supplies with somewhat better yields were available.

Although adjacent to Biscotasing Lake, none of the permanent residences utilized this source. The lake is very shallow around the majority of the community and the water almost entirely recede during the fall drawdown cycle. This situation, and the location of the railway tracks which serves as an artificial barrier to lake access, appears to make the lake unfeasible as a water source for the residents.

SAMPLE ANALYSIS RESULTS

The water supply at homes with dug wells was found to be poor in quality and quantity. During periods of dry weather, all but a few of these supplies were reported to run dry. Half of the 9 supplies (including the community well) also run dry, or produce very little water during the winter. Most residents resort to snow-melt during these times.

Residences served by drilled wells reported that they have few water quantity or quality problems.

See Tables E and F for a summary of the data collected on the wells.

Bacterial Examination Results

The results of the bacteriological analysis of the drinking water samples indicate that there are 6 supply systems with problems. Total and/or Fecal coliform organisms were found to be present in these water supplies. These organisms are indicators of bacteriological contamination. The owners of these systems were notified of these results.

The presence of total coliforms can indicate contact with soil runoff or less recent fecal pollution. Fecal coliform

originates in the intestinal tract of warm blooded animals, and their presence in water indicate recent contamination by sewage.

Of the 6 contaminated systems, 5 were found to be dug wells. This contamination from surface runoff water entering the well, improper construction, or improper well maintenance may have resulted in the bacteriological concentrations found in these wells.

Bacteriological contamination by total coliforms was found in only one drilled well. This would suggest that the aquifer serving the drilled wells in the area, and the well installations themselves, are generally free of contamination, and can be considered acceptable from a bacteriological standpoint.

Chemical Results

The chemical results of the water samples collected during the survey are presented in Tables G and H. The median was not calculated for those parameters where 3 or fewer samples were collected.

The accepted limit for nitrate was exceeded in one well. A second well had a sodium concentration which exceeded the reporting criteria. The amount by which these parameters exceeded the accepted criteria was small.

With respect to sodium concentrations in water, the MOE does not presently have a maximum criteria limit. However, sodium is considered to be a health related parameter which, when consumed at elevated concentrations, can aggravate persons with chronic heart and hypertensive problems. Therefore, the Medical Officer of Health of the Sudbury and District Health Unit is routinely advised of all water supplies which have sodium concentrations of 20 mg/L or more. One dug well water supply was found to have a sodium concentration of 23 mg/L.

Nitrate levels were found to exceed the MOE's criteria of 10 mg/L (as Nitrogen) in 1 water supply. The concentration in this water supply was found to be 11.0 mg/L. The criteria is based on evidence that nitrate in drinking water has been associated with an oxygen starved condition in infants 3 months and less known as methemoglobinemia. Older children and adults have a much greater tolerance for higher levels without encountering nitrate toxicity.

The aesthetic parameters of manganese, iron, colour, turbidity and zinc were found to exceed the drinking water objective limits in many samples. Excessive concentrations of manganese and iron were found in 32% and 42% of the wells sampled, respectively. These, plus other parameters, lead to excessive turbidity values in 63% of wells, and excessive colour in 37% of the wells. Of the 3 wells samples for

metals analysis, the water of 1 well was found to contain a concentration of 5.2 mg/L zinc. This concentration just exceeded the aesthetic quality limit of 5.0 mg/L which is based on the threshold level for taste and surface oiliness.

When the well water quality data are examined, it appears that many of the wells suffer from aesthetic water problems.

DISCUSSION

The Community of Biscotasing is a small isolated hamlet located on the CPR mainline about 275 kilometers northwest of Sudbury by road.

During the survey it became obvious that a great many (47%) of the residents in the hamlet do not have any domestic water supply due to the poor overburden aquifers in the area. The water quantity and quality of those residents who do have dug wells is also very poor. In addition, many of the dug wells were found to be contaminated bacteriologically.

There are 6 drilled wells presently established in the community. It appears, based on the data collected during the survey, that drilled wells will supply the most satisfactory water in terms of quantity and quality. The reason for there being only 6 drilled wells is the high cost involved in getting a drill rig into Biscotasing. This is only possible when a number of wells are agreed to be drilled in advance.

The lake could also be used as the source of water supply. There are, however, problems with this alternative. The lake level is controlled by dams maintained by Inco. During the late fall, the level of the lake is lowered. Due to the

shallow depth of the lake near the majority of the townsite and the fluctuation in lake levels, a very long intake line would have to be provided. This would not be feasible for individual private systems, but may be possible for a communal system.

There is very limited information available with regard to the water quality of the lake. This information would have to be provided to determine the degree of treatment required for an approval from the MOE's Municipal and Private Approvals Section if a communal water system alternative were to be considered.

Although there is a community organization in the form of the Biscotasing Citizens Committee, there is no Municipal Authority or Local Improvement Board in the community at the present time. Therefore, there is no formally recognized group presently available who could operate and maintain a water treatment plant and distribution system, should a communal system be considered.

At present the sewage systems appear to be operating satisfactorally. This however, is due to the limited amount of water available to the majority of the residents. Should an abundant supply of water become available many of the present sewage systems would not be adequate and would fail. This could lead to serious groundwater contamination and possible health problems.

CONCLUSIONS

From an examination of the data collected by the Ministry during this survey, it was determined that:

1. Over half the full time residents of this community either do not have their own water supply, and therefore must carry water by pail from their neighbours or a community dug well, others they do not feel that their own supply is adequate.

2. Dug wells serve over half the residents of the community who have water. Six (6) of the 9 wells were found to have been bacteriologically contaminated. All of the dug wells have water quantity problems. These problems persist summer and winter. The water from many of the dug wells must be obtained by hand.

3. The drilled wells appear to be the only good sources of water. There are only a few drilled wells due to the high cost of bringing a drill rig into the community.

4. If the lake is used as an alternative source of water, then, due to the seasonal fluctuations of the water level, use of a very long water intake or transmission main is required. This would rule out such an option for private systems, but may be feasible for a communal system.

5. Development of a communal water system would require the establishment of a recognized organization to operate it.

6. The present sewage disposal systems are not now a problem. However, should a program go ahead which would provide new and adequate water supplies, substantial upgrading and conversion to Class IV (septic tank and tile bed) systems would be required.

RECOMMENDATION

The community needs to improve the water supply systems available to the residents. Installation of drilled wells and class IV sewage systems would appear to be the desirable solution. Alternatively, the provision of drilled wells to serve as community supplies. Allowance could be made to provide either water fill-up stations for water hauling, or piping to several individual residences.

Due to the 'area' nature of the water supply problems in the community, it is recommended that the eligibility for a Ministry of the Environment Small Systems Alternative Grant to provide drilled wells and upgrading of sewage disposal systems be investigated.

TABLE A

Land Ownership

Privately Owned		Rent or Leases from CPR		Rent or Leases from Other	
Number	%	Number	%	Number	%
16	57.1	11	39.3	1	3.6

TABLE B

SEWAGE SYSTEMS

Total Number of Sewage Systems

Type	Number	Percent
Septic tank and tile field	8	22
Pit Privy	17	42
Leaching Pit	3	8

TABLE C

WELL SUMMARY

PRIVATE SYSTEMS

Type	Number	Percent
Drilled Well	6	21
Dug Well in Use	7	25
Point	0	0
Hauled by Pail from Community Wells (C.W.)	15	54

MULTI-FAMILY WELLS

Well	Type	Age(yrs)	Depth(ft)	Service
Michauds	Dug	40	17	3-5 families
C.W.#1	Dug	30	12	unknown
C.W.#2	Dug	25+	5	7-8 families at times

TABLE D

PRIVATE SEWAGE SYSTEMS

Ages(yrs)	Number	Percent
0-5	9	60
6-10	1	7
11-15	0	0
16-25	0	0
725	4	26
Unknown	1	7

TABLE E

DEPTHS OF DUG WELLS

Depth(ft)	Number	Percent
0-10	7	78
11-20	2	22
21-30	0	0
730	0	0

DEPTHS OF DRILLED WELLS

Depth(ft)	Number	Percent
0-50	1	17
51-100	0	0
101-200	1	17
201-300	3	49
301-400	0	0
>400	1	17

TABLE F

Water Supply Information

Type of Water Supply	Number	% of	Av. Depth of Well Type	Adverse Number	Bacterlogical %	Chemical Number	Problems %
Haul	1	50	-	-	-	-	-
Dug Well*	9	30	9.3'	5	55.6	6	66.7
Point	-	-	-	-	-	-	-
Drilled Well	6	20	247'	1	16.7	3	50

* Includes Community Wells

TABLE D

Consumer Complaints

Type	Number
Taste	7
Odour	2
Colour	7
Hardness	4
Iron	5
Quantity	7

TABLE G

GROUNDWATER QUALITY

DUG WELLS

Parameter	Min.	Max.	Median	Average*	No. of Samples	Units
Hardness	29	160	55		12	mg/L
Alkalinity	7	124	45		12	mg/L
Chlorides	2	19	4		12	mg/L
Conductivity	78	430	137		12	µmhos
Iron	0	7	0.16		12	mg/L
Sodium	1.5	23	4		12	mg/L
Sulphate	9	28	13		11	mg/L
Manganese	0	3.3	0.02		12	mg/L
pH	6.0	7.9	6.8		12	-
Colour	0.9	177.2	17		12	
Turbidity	0.48	14	1.1		12	
Nitrate	0.1	11.0	0.55		12	mg/L

*Used if there are 3 or fewer samples.

TABLE H

GROUNDWATER QUALITY

DRILLED WELLS

Parameter	Min.	Max.	Median	Average*	No. of Sample	Unit
Hardness	67	170	105		6	mg/L
Alkalinity	52	142	95		6	mg/L
Chlorides	6	25	8		6	mg/L
Conductivity	200	520	295		6	µmhos
Iron	0.1	0.55	0.095		6	mg/L
Sodium	6.5	11.5	9.5		6	mg/L
Sulphates	11	33	19.5		6	mg/L
Manganese	0.008	0.082	0.26		6	mg/L
pH	7.1	8.2	7.5		6	-
Colour	0.6	8.3	2.1		6	
Turbidity	0.9	1.1	1		6	
Flouride				0.51	3	mg/L
Total Organic Carbon				2.9	3	mg/L
Magnesium				9.7	3	mg/L
Calcium				37	3	mg/L
Potassium				2.7	3	mg/L
Ammonia				<0.1**	3	mg/L
Kjeldahl Nitrogen				0.33	3	mg/L
Nitrites				<0.01	3	mg/L
Nitrates	0.1	2.7	0.8	1.4	6	mg/L
Copper				0.083	3	mg/L
Zinc				1.75	3	mg/L
Lead				0.004	3	mg/L
Chromium				<0.002	3	mg/L
Radmium				0.0016	3	mg/L
Arsenic				0.005	3	mg/L
Selenium				<0.001	3	mg/L
Silicates				5.38	3	mg/L
Nickel				<0.002	3	mg/L
Phenol						

* Used if there were 3 or fewer sampled
** Result may be 0

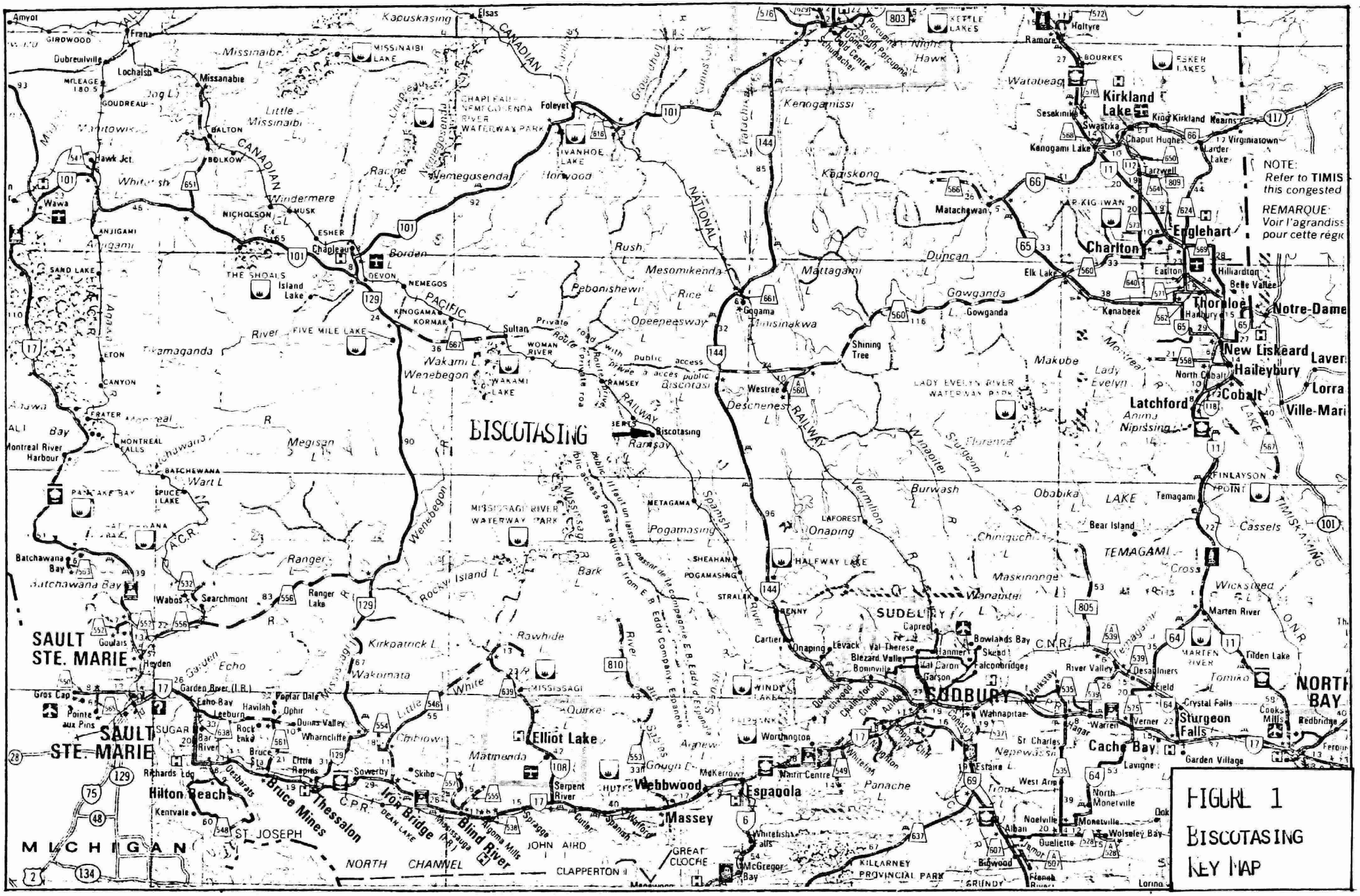

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FIGURE 1
BISCOTASING
KEY MAP

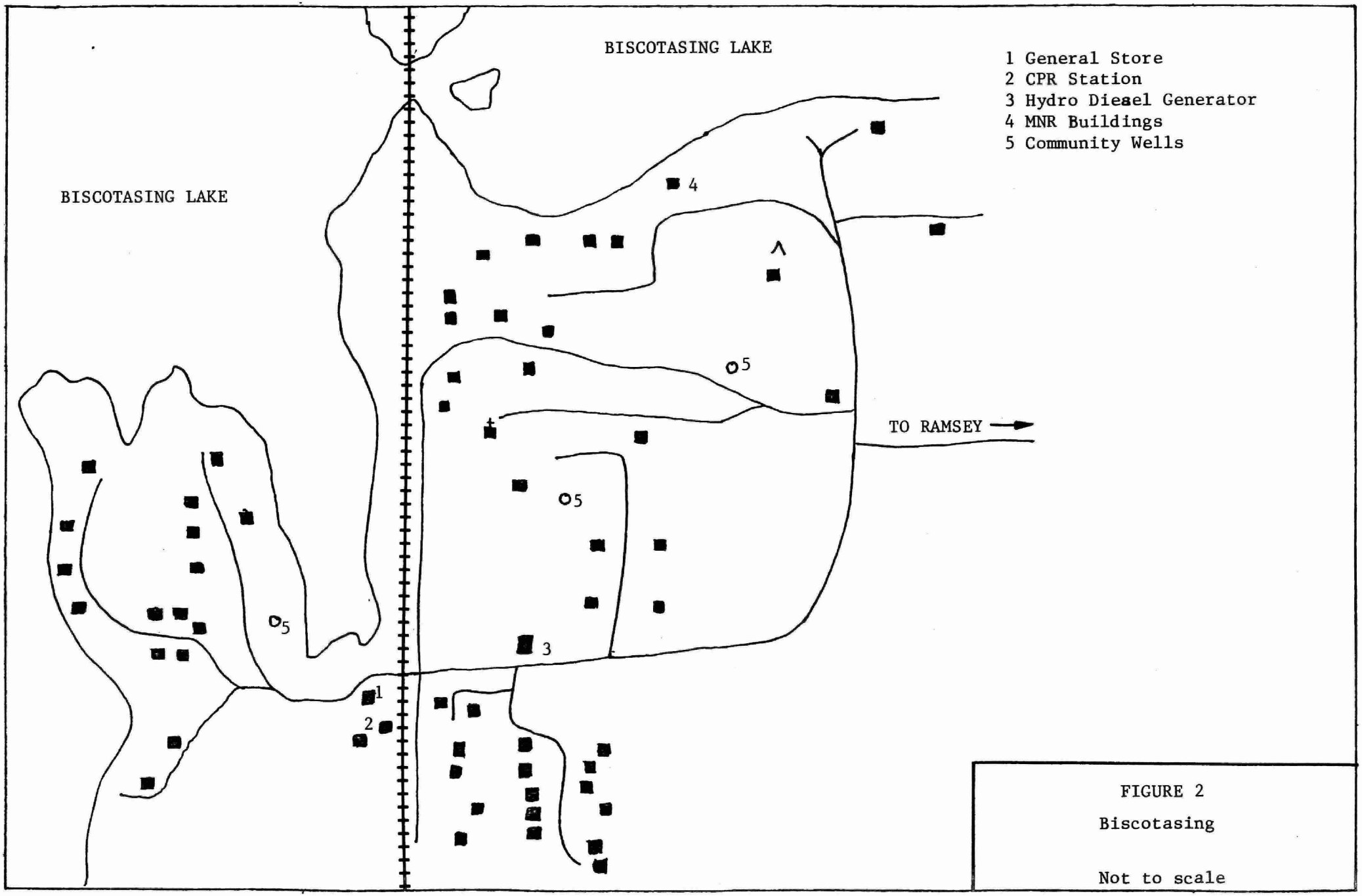
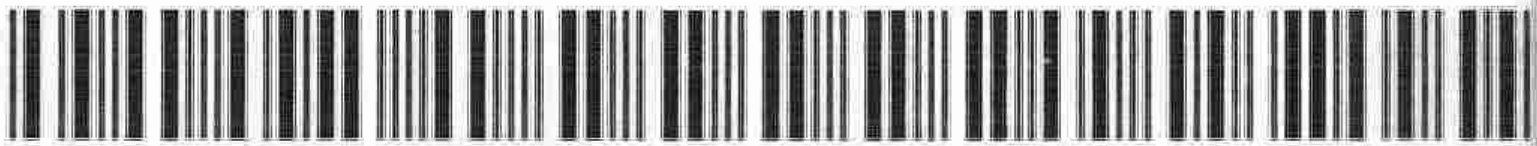


FIGURE 2

Biscotasing

Not to scale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